the CANNON

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Faculty Addresses Funding Problems

by Jobn Samochin
Eng. Sci. 8T3

A great deal has been said recently about the funding levels of Ontario Universities. Student concern over the financial issues has never been bigher. In the Faculty of Applied Science and Engineering, where the nature of the education depends heavily on being abreast of technological changes, and, consequently, on the availability of funds, students are becoming increasingly interested in tbe financial workings of the Faculty.

The Faculty of Applied Science and Engineering receives an allocation from the University; last year engineering received an operating budget of $12.4 million. The procedure used to determine the budget for the subsequent year is to take the last year's budget, reduce it by 1-3% and then determine wbere this cut can be made. These budget cuts bave been made every year for the past 5 years with this year's budget being approximately $125,000 less than last year's budget. This initial cut is made immediately, but an amount is added later for salary settlements. Gordon R. Slemon Dean of the Faculty of Applied Science and Engineering, when interviewed by The Cannon pointed out that the equipment and supplies budget for Engineering is only about 5% of the total and that in previous years tbe cut has often been made in that area, at least partially. To lose 1% burts, he added, but losing 3% could be disastrous.

Because the majority of the budget goes to salaries, the faculty has found itself past the point where the cut can be made in supplies and equipment, necessitating the reduction of staff. The reduction to date bas come in the form of not replacing professors after they retire and reducing shop staff. Some of the shop staff are paid through research funding but, technically, are not working for tbe University of Toronto. The number of teaching assistants has also been reduced. Dean Slemon remarked that this hurts both the students as well as the teaching assistants; the TA's are paid less and take fewer graduate courses so tbat the number of graduate students is reduced overall. However, the Dean did say that funding for Engineering students in all of Ontario is very similar, being approximately $1,000 per student less than the national average for full-time undergraduate engineering students. This situation is not an exclusive one for engineering, most Ontario university students are underfunded by approximately this same figure.

Approximately 87% of engineering's funding comes from Queen's Park, with the remainder paid mostly by the students in the form of fees. The University of Toronto reduces overhead by not cbarging the Faculty for space or heating, but staff must be paid by the Faculty. Industry provides no direct funding but contributes indirectly through some contributions to the Varsity and Update funds and througb work contracted within the faculty. Courses offered in continuing education by the Faculty to members of industry are expected to pay for themselves, and do not rely on Faculty expenditure.

The effects of underfunding have been keenly felt in the engineering ranks. The equipment used in labs getting one year older and out of date, although not a critical situation, is certainly an unenviable one. The average age of the teaching staff has increased, with there being very few professors in the 30 to 40 age group. Dean Slemon noted that this is both good and bad. "The staff have never been better," said Dean Slemon, "but the lack of young professors now may cause some significant problems for my successor." The Dean explained that a large portion of the present staff is due to retire within the next decade and that there is a shortage of young professors, those just finishing graduate school. This shortage of young staff doesn't burt the graduating engineers now, he added, and besides. having an older staff brings a great deal of experience which is helping the faculty cope with underfunding and inflation.

If the present trends continue, tbe situation in engineering will get worse. The aging equipment and lack of young professors is not hurting the standards of APSC now, and the graduates of tbe engineering programs are not deficient in any way, asserted the Dean. However, the APSC is using up its reserves now and if the current funding levels don't change, there could be a major crisis in 5 to 10 years.

Dean Slemon pointed out that the Faculty cannot rely upon the government to change its funding policies overnight, and so the Faculty is looking to other sources of funds. One idea has been to increase the amount of contract work done in the Faculty of Engineering. The

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This Month

Incorporation

The Engineering Society Executive has prepared a timetable that will lead the Society to incorporation. If everything goes according to plan, the corporation should be in place by March. page 2

Toike Plans

The Society is seeking a new direction for the Toike Oike. To this end, last year's Toike editor, Bob Moult, has been recruiting new writers and soliciting new material. This displeases some people. page 4

Premier William Davis speaks at the dedication of the Duffin Creek Sewage Treatment Plant.

Treatment System A Milestone

by Daryl Wilson
Chem. Eng. 8T2

Stretching out over seventy miles, the York-Durham sewage system will one day service up to 800,000 people and some 17,000 industrial acres. At an average of 100 gallons per capita per day that translates into a lot of sewage.

The Ministry of the Environment has been involved in the administration and construction of this major project for the last twelve years. At present a portion of the line is operating and the Duffin Creek Sewage Treatment Plant is receiving sewage at the Pickering site. Ultimately, the system will take sewage from Woodbridge to the west and as far north as Newmarket and carry it to the single treatment facility on Lake Ontario.

The present capacity for treatment is 40 million gallons per day. The main trunk however was designed for flows up to 160 million gallons. The plant facility will be extended in three stages of 40 million gallons capacity each as need dictates in the future. In its entirety, tbe scheme represents the largest ever undertaken by the ministry and the biggest grassroots construction of a sewage system in Canada.

When the first stage is completed, existing treatment plants on sites at Markham, Unionville, John Street, the North Don River, West Don River and Richmond Hill will be pbased out. Already, pollution control systems in Pickering, Ajax and at Liverpool Road have been rerouted to the Duffin Creek plant. The closing of these nine plants will relieve the overtaxed waterways into which they previously ran their effluent. In the case of the Don River this relief is long overdue. Immediate benefits will also be reaped by the Rouge and Holland Rivers as well as Duffin Creek. Studies show that phosphorus discharge into Lake Simcoe will be reduced by 6 tonnes a year. The present discharge of phosphorus from all sources into Simcoe is 103 tonnes per year, well above the acceptable level of 80 tonnes. This reduction of six tonnes is a needful improvement. A better ecological balance in tbe York-Durham regions will be brought about by the refined treatment of waste at the single plant which can discharge directly into Lake Ontario.

Ecological concerns have not only been the object for the completed project. During construction the system has represented an ecological milestone. This is the first large scale project to have a full-time independent environmental inspector. It was the vision of the project administrators that the environment not play second

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THE CANNON encourages submissions; please type or write legibly. Deadline for articles is one week before publication date, notices and letters by 5:00 p.m. the Friday prior to publication. Comments on THE CANNON or articles appearing in it are appreciated. The editors reserve the right to edit letters for brevity.

Letters

I am writing in response to the comments offered by Emil Joannou on the OFS pamphlet "A Prescription for Higher Education". This pamphlet points to may of the inadequacies of the Ontario Student Assistance Program (OSAP), such as the fact that families living below the poverty line are expected to contribute to their children's education.

It is unfortunate that in the 1950s people like Mr. Joannou's father—and my own father—had to work to put themselves through university. Their contribution to society would have been that much greater had a post-secondary education heen readily accessible to them.

There are, granted, a few individuals who ahuse the OSAP. Their numhers are inconsequential relative to the thousands of students who henefit from OSAP;who wouldn't be at University without OSAP.

Unfortunately, there are many more students, who, because of the quirks of the OSAP system, do not receive the benefits of a post-secondary education. These individuals are often working against family and social presures not to attend university.

Let these people have an opportunity to receive the post-secondary education that many of us are fortunate enough to have provided for us by our parents. These people aren't soft; they just want something which is their right: an education.

Janet B. Lewis
External Commissioner
Students' Administrative Council

Living By Our Wits

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present research budget is 6 million dollars and this can he increased by the solicitation of contracted research. The Faculty already does a significant amount of this work, hut Dean Slemon says that it is difficult to make money from contract work. The majority of contracts to Universities originate from the federal government. The government contracts carry stipulations which do not allow the contracted University to charge more than 30% overhead, whereas in industrial contracts the Faculty can charge what the private sector does for services, up to 100% overhead. One of the difficulties expected upon doing contract type work has been in the realm of ethical justification. The University does reserve the right to publish but information received from the private company is kept confidential. The most important information that the company seeks is in the area of "know-how" or technique, and this type of detailed information is rarely puhlished hy anyone in scientific reports. Thus there are a large number of contracts in which there is no ethical conflict between the desire of the contract company to keep the research for their exclusive use and the goal of the University in the freedom and spreading of knowledge.

Another proposed solution to the funding sitution has heen the Innovations Foundation. President Ham has stated that universities will have to start living hy their wits and, in answer, this foundation has heen formed. The main goal of the Innovations Foundation is to bring proposals originating in the University to marketahle development. It is open to the entire University for submissions of ideas and proposals with Dean Slemon acting as Chairman of the Board and Prof. G. P. Adamson as the executive director. Currently the Foundation has 50 projects underway with 26 of those coming from Engineering.

The Faculty of Applied Science and Engineering is looking to as many different sources of funding as possihle to alleviate the present underfunding by the government. However, "if we can't increase our funding significantly through these means," added Dean Slemon, "then we must increase our prices to our market. And the market in this case is students." In the future it may he necessary for students to pay for up to 50% of the real cost of their education. Last year, when the provincial government proposed a tuition increase of up to 18.5%, the Faculty was prevented from raising their tuition by more than 3% hy a Provincial ceiling on Engineering tuition. Unofficially, some students approached Dean Slemon and stated that they would not mind playing higher academic fees for the education they were receiving. This, concluded the Dean, is encouraging, hecause "I will not sacrifice the quality of a professional engineering education in order to maintain fees at their present level."

A Critical Path to Incorporation

by John Byrne
Vice-President
Administration

As most students should be aware by now, the Engineering Society is in the process of becoming incorporated. This can be a rather long and complicated procedure, but if all things go according to plan, the incorporated Society should be in place by the joint Council meeting in March. The Society's lawyer and the Society Executive have decided on a tentative schedule, and although it sounds somewhat involved, it will expedite the process considerably.

Essentially, it involves the establishment of a corporation that will initially include the President and two Vice-Presidents of the Engineering Society as its three directors and only three members. Once the corporation has been approved by the Ontario government, it will vote to admit as members all present members of the University of Toronto Engineering Society. This includes, of course, all alumni of the Faculty. The corporation shall retain the same name. It will have adopted, by this time, a constitution which, with some exception, will be the same as the Society's existing constitution. These exceptions include clauses necessary to ensure compatibility with the Ontario Corporations Act. For example, the Act requires provision for an annual general meeting of all members to appoint an auditor, the maintaining of complete records of all past and present members, and limits on borrowing by the Society. The entire constitution, with these additions, will be published in the February 3 issue of The Cannon.

Once in place, the directors of the corporation will include all those who presently constitute the Society's Council, and the Society will operate in exactly the same manner, while enjoying the benefits of incorporation.

Below is the schedule that will he followed in order to achieve our goal by March. Anyone who wishes clarification of any of these proposals, or who would like to offer some input to the process are welcome to contact John Byrne, Vice-President Administration, or Mike Nettleton, Chairman of the Constitutional Amendment Committee, through their mailboxes in the Engineering Stores.

Incorporation Timetable

Novemher 21, 1980
Draft of the Constitution is sent to the University administration and its lawyers.

Decemher 15, 1980
The proposed Constitution is distrihuted to Council members, and made available to all Society members to allow for perusal. Suggested amendments are welcome.

January 12, 1981
Final deadline for proposals to the Constitution Committee.

January 19, 1981
Constitution Committee finalizes its amended Constitution for recommendation to Council.

January 20, 1981
Resolutions are introduced in Council to:
a)Permit the President and two Vice-Presidents to apply for incorporation with no shared capital under the name of "University of Toronto Engineering Society".
b)Pass Constitution for the first time (must pass at two consecutive meetings of Council).
c)Announce referendum seeking approval for incorporation.

February 3, 1981
Proposed Constitution is published in the Cannon.

February 5, 6, 1981
Referendum is held to approve incorporation.

February 10, 1981
Resolution is introduced in Council to pass Constitution second time, thereby making amendments official.

February 19, 1981
Incorporation approved hy Governing Council. Following this approval the three directors apply for incorporation. Upon receipt of letters patent, the three directors vote to admit Society members and adopt Constitution.

March 17, 1981
At Joint Council Meeting, outgoing Council dissolves old Society. New Council meeting is first Council meeting of the new Corporation.

Faculty Announces Research Fellowships

The Council of the Faculty of Applied Science and Engineering recently announced this year's winners of the Applied Science and Engineering Graduate Fellowships; the award winners are participants in the Co-ordinated Bachelor/Master's Program in the current session. They are: Brian Baetz, Civil; Wing Hung Ching, Chemical; Yu Wai Anthony Chiu, Electrical; Steve John Crossley, Electrical; Patrick Kin Man Lam, Mechanical; Peng Koon Leong, Civil; Dennis Ivars Melnbardis, Industrial; David Malcolm Smith, Mechanical; Jason Chik Shun Woo, Engineering Science; and, Matthew Chak-Ming Yum, Industrial.

The Co-ordinated Bachelor/Master's Program is available in the fourth year of the undergraduate curriculum and is designed for students who intend to continue to a Master's degree after completion of the B.A.Sc. Students accepted in the Program enroll in the Co-ordinated Program Thesis and choose the Fourth Year elective subjects in consultation with a thesis supervisor so as to complement the topic of tbe thesis. The program is intended to permit qualified students to co-ordinate a portion of their undergraduate course work with the needs of a graduate program, and permits a significant reduction in the time necessary for the completion of the Master's degree requirements.

The award consists of a $50 book prize, and for Fellowship winners who are registered as Master's students on November 1, 1981, free regular tuition and incidental fees for the first year of postgraduate work in the School of Graduate Studies.

Built With Care for Ecology

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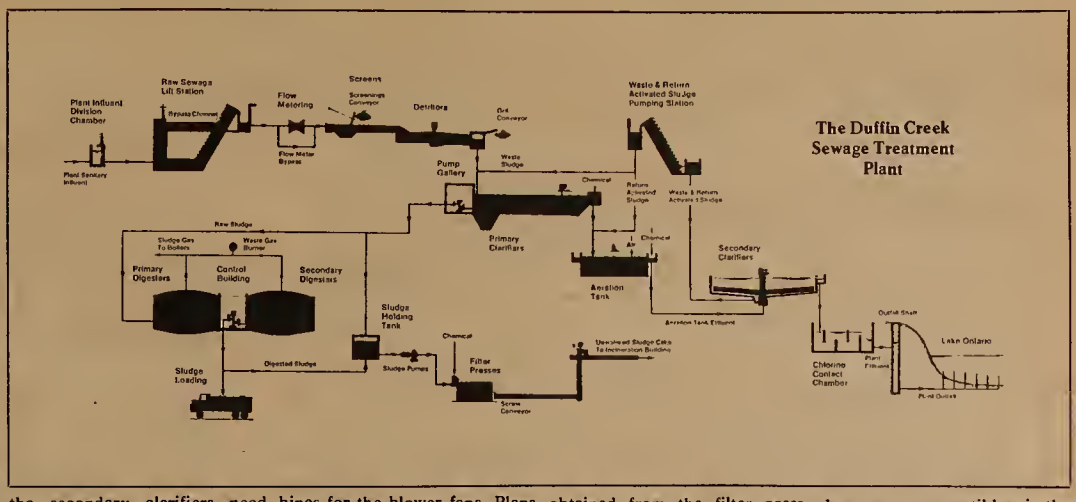
fiddle to speed and economics. The pipeline passed through six golf courses, a lake in a conservation area, passed by a mink farm, riding stables and even a monarch butterfly congregation ground. In all of these areas, concern and care were enforced in matters of noise pollution, ground disruption, and preservation of natural water courses. The roots and branches of trees were protected and treated if any damages was incurred. Trenching and dewatering operations were overseen so that no unnecessary erosion of ground would result at the time of construction or afterwards. Restoration operations in many areas of line construction are simply unparalleled.



The Duffin Creek Sewage Treatment Plant

In the shadow of the Pickering Nuclear Generating Station, along the lakefront to the east of Toronto, the 65 million dollar treatment plant terminates the pipeline. Tbougb an ancient technique, the conventional process of activated sludge sewage treatment is the basis of the plant's operation. Technology in this area has not kept pace with the march of innovation in other fields. Being a natural process, the cost and efficiency in accomplishing the breakdown of the waste is optimal with little need for macrotecbnology.

Influent is received by the plant from a 32 metre diameter trunk line and is first elevated by screw pumps so that the remaining operations may work on gravity flow. These massive screw pumps, three in number, are a sight to behold. At 3.2 m in diameter and 15.2 m in lengtb, tbey are each driven by a 355 kw motor and are capable of lifting 1,000 cubic meters of sewage per hour. Large screenable materials are removed by six mechanically-cleaned, hydraulically-activated screens in the first process step. Grit tanks or detritors tben remove finer granular wastes by allowing them to settle in scraped-bottom circular tanks. Both tbe grit and unreduced solids are removed to landfill sites.

In tbe third process unit, the influent is held for approximately three hours in four rectangular primary clarifiers. Here the surface scum is skimmed and the settling sludge is dredged by a moving bridge mechanism. Following this, chemical treatment of the sewage is initiated in the aeration tanks.

Holding time in the aeration tanks is seven to eight hours. Aeration is accomplished by vigorous agitation in sixteen small segmented tanks each equipped with a rotating shrouded centrifugal impeller. The activated liquor from the aeration stage moves on to secondary circular clarifiers where the now activated sludge is settled and then removed by bottom scrapers. In an effort to balance the aerobic decomposition process, most of the sludge removed from the secondary clarifiers is recycled to the head of the aeration tanks. The balance of the activated sludge is returned to the head of the primary clarifiers. Effluent from the secondary clarifiers need only be disinfected with chlorine before being discharged to the lake. The specifications for the plant effluent are 15 ppm suspended solids and 15 ppm biological oxygen demand (BOD). A 3 m diameter line extends 1.1 km under the lake bed to numerous small diameter diffuser lines where the effluent is discharged.

A major concern in the sewage treatment process is dealing with the sludge. After having been dredged from the primary clarifiers, recycled activated sludge and crude sludge is transferred to the digesters. Here, anaerobic biological decomposition is aided by holding the sludge for tbirty days at 35 degrees C. The Duffin Creek plant has four digesters with a unique jet-blast agitation system which functions on gas produced by tbe sludge. This sludge gas, a mixture of methane and hydrogen sulpbide, is also removed and used for fuel to produce steam needed to heat tbe plant buildings.

By far the most obvious solution for dealing with sludge is to truck it to farmland and landfill sites. The nature of the sludge, often rich in heavy metals and other intolerables, does not always guarantee agricultural utility. Land in the immediate area would eventually be overcome, and as sites moved further away, transportation and distribution costs would become probibitive. While this option remains open, and will even be used initially, provision was made at the Duffin site for sludge incineration.

Perhaps the most refined and innovative part of the plant is this incineration process. The sludge is dewatered by belt filter presses and is fed to a fluidized-bed incinerator by variable speed screw feed mechanisms. Sixty eight tonnes of hard, dry silica sand is fluidized by combustion air blown into the incinerator chamber. The sand serves to break up the sludge and partially incinerate it. As the degraded sludge reaches the top of the combustion chamber the combustion process is completed at 860 degrees C. The exit gases are used to preheat the blower air to 580 degrees C. A waste heat boiler is used to produce steam to drive the 485 kw steam turbines for the blower fans. Plans are being considered to use excess steam for generation of electricity to power the plant's aeration process equipment.

Incinerator gases are finally cooled and scrubbed of ash and exhausted from the incinerator stack.

Autogenous burning of sludge can be accomplished with twenty-six percent dewatered feed to the incinerator. Beyond this, auxiliary fuel must be added. Some of the combustion air is obtained from the filter press building where odourous gas is plentiful and exhaust to the atmosphere is not desirable. While the capital outlay for the incinerator is large, regulations make necessary the burning of the sludge at bigh throughputs.

The cost of the plant at its present capacity is $255 million. The projected figure after completion of all four stages is $330 million. The growth rate in the regions of York and Durham, however, may not make the later phases necessary until late in the century. The project involved one hundred and ten contracts, sixty contractors, and twenty consultants.

Large scale municipal engineering projects such as the York-Durham system take years of careful planning and a wide range of social, technical, political, and administrative considerations. To date the project is on schedule, and within budget.

Eng. Soc. Announcements

Skule Nite 8T1

Auditions for Skule Nite, the engineering musical-comedy revue are being held Tuesday, November 27 from 6:30 pm to 9:30 pm in the old Metro Library, 20 St. George St. Cast and crew alike are welcome. Take the stairs to the third floor.

Toike Oike T-shirts

Toike Oike T-shirts are availahle in the Engineering Stores for only $5.00. Save two dollars on a T-shirt and a 1979-80 Toike set, only $7.00.

Toike Writers

Writers with drafts or ideas for the January 22 'People' Toike should submit their material Thursday, November 27, between 4:00 and 6:00 pm at the Debates Room, Hart House.

Engineering Ski Day

Skule has Osler Bluff all to itself for an Engineering Ski day. Before December 19, tickets are $15, including lift ticket, transportation and prizes. Tickets are $18 after January 5, and two dollars off if you're providing your own transportation.

Skule Wins Mulock Cup

For the first time since 1956, Engineering has earned a place for its name on the Mulock Cup. The Skule football team captured the interfaculty trophy, the oldest football trophy in Canada, with a last minute 33-30 win over St. Michael's College on Novemher 14.

St. Mike's dominated the game through most of the first half, which ended 24-7 in their favour. Paul Kolisnyk scored the lone Skule major, returning a St. Mike's fumble twenty-five yards.

In the third quarter, the Engineering passing game seemed to come alive as quarterback Guy Armstrong repeatedly found receiver Steve Skurnac. Skurnac scored once on a nine yard pass, and Armstrong himself scored, narrowing the margin to 24-20

Another touchdown by St. Mike's, although not converted, gave them what appeared to be a comfortable ten point lead. However, with only 1:33 remaining, the Skule team shifted into high gear. Armstrong, playing only his second game as quarterback, marched Skule down field to the St. Mike's six yard line. A touchdown pass to Skurnac made the score 30-27. There were 48 seconds remaining in regulation time.

Skule's kicker, Henry Wolski, executed a perfect onside kick, which was recovered by Skuls's Nick Rallis. Three consecutive passes from Armstrong to Skurnac, of 8, 15, and 22 yards, led to the game winning touchdown, with eleven seconds on the clock.

The Engineering squad demonstrated excellent ability and determination in overcoming the favoured St. Mike's team. Skule's "never-say-die" attitude was admired by their opponents, and by the game's spectators.

A New Toike?

At á Communication Committee meeting in late September, it was decided a new direction should be sought for the Toike Oike. It was felt that the paper was not fulfilling its mandate as a humour publication, nor was it a credit to the Society. At that time, it was agreed that last year's editor, Bob Moult, would actively solicit material for a Toike to publish January 22, hopefully the first of the better quality Toikes.

Since that time, Moult has spoken to a number of student socities, such as St. Michael's, Victoria, Trinity, and the Arts and Science Student Union. He has met with some success. 'So far, eight or ten people have offerred their help', he says. He won't know how many of these offers will see fruition until a writer's meeting November 27 at which ideas will be discussed.

At the Council meeting of November 18, some members expressed their displeasure with Moult's activities. Vicken Aharonian, the Council's executive SAC rep maintains Moult was made a fool of when he presented his proposals to the SAC Board of Directors.'Since he was last year's Toike editor, and the cause of many controversies, no one helieved him when he presented his plans for a new Toike', said Aharonian. Aharonian presented a motion calling for the Society to make official the fact that Moult is not representing the Society at these meetings, but is acting individually.'I don't want Bob Moult representing me', he said.The motion was tabled when quorum was lost.